

SCHOTTKY BIPOLAR LSI MICROCOMPUTER SET

3216 PARALLEL BIDIRECTIONAL BUS DRIVER

The INTEL Bipolar Microcomputer Set is a family of Schottky bipolar LSI circuits which simplify the construction of microprogrammed central processors and device controllers. These processors and controllers are truly microprogrammed in the sense that their control logic is organized around a separate read-only memory called the microprogram memory. Control signals for the various processing elements are generated by the microinstructions contained in the microprogram memory. In the implementation of a typical central processor, as shown below, the microprogram interprets a higher level of instructions called macroinstructions, similar to those found in a small computer. For device controllers, the microprograms directly implement the required control functions.

The INTEL 3216 is a high-speed 4-bit Parallel, Bidirectional Bus Driver. Its three-state outputs enable it to isolate and drive external bus structures associated with Series 3000 systems

The 3216 driver and receiver gates have three state outputs with PNP inputs. When the drivers or receivers are tri-stated the inputs are disabled, presenting a low current load, typically less than 40 μ amps, to the system bus structure.

High Performance—20 ns typical propagation delay
Low Input Load Current—0.25 mA maximum
High Output Drive Capability for Driving System Data Busses
Three-State Outputs
TTL Compatible
16-pin DIP

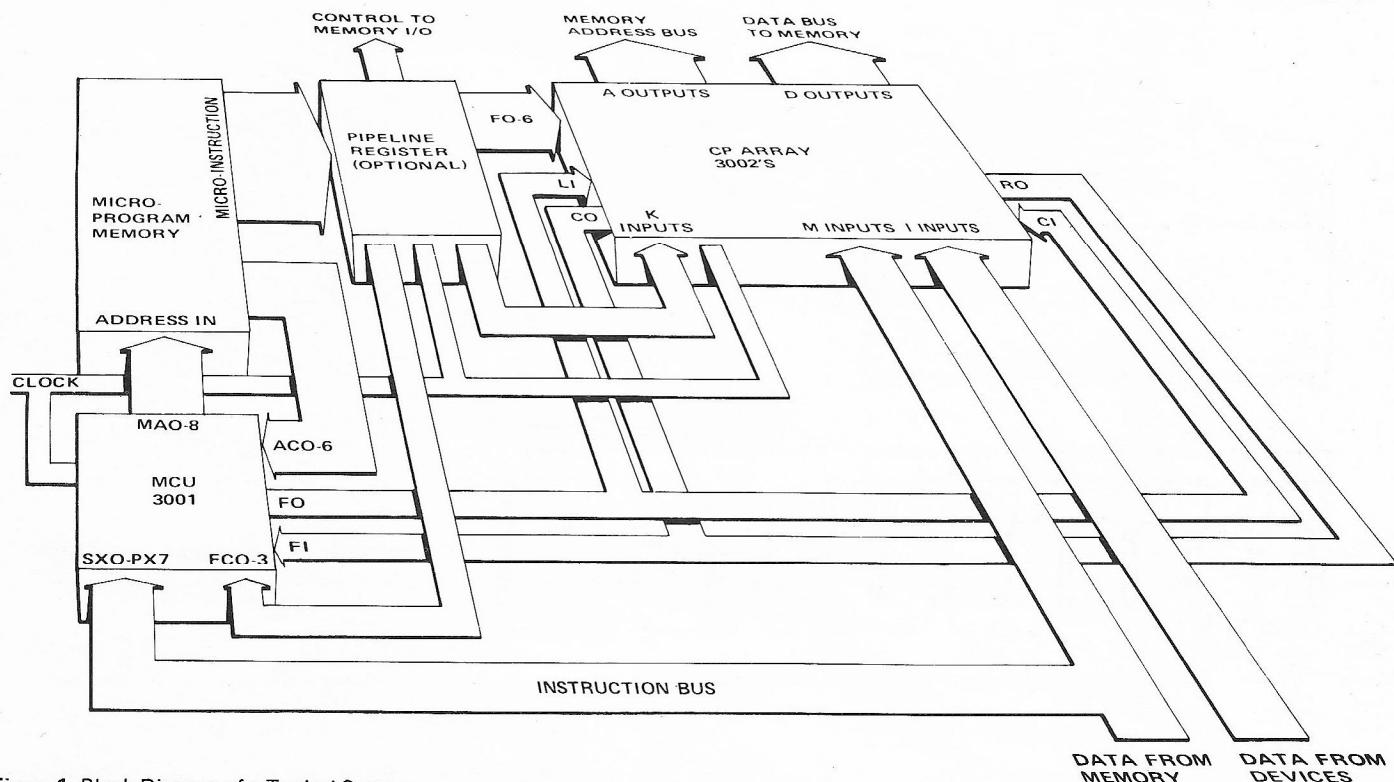


Figure 1. Block Diagram of a Typical System

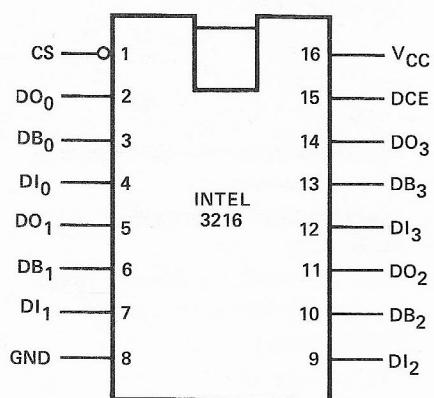
Other members of the INTEL Bipolar Microcomputer Set:

3001 Microprogram Control Unit
 3002 Central Processing Element
 3003 Look-Ahead Carry Generator

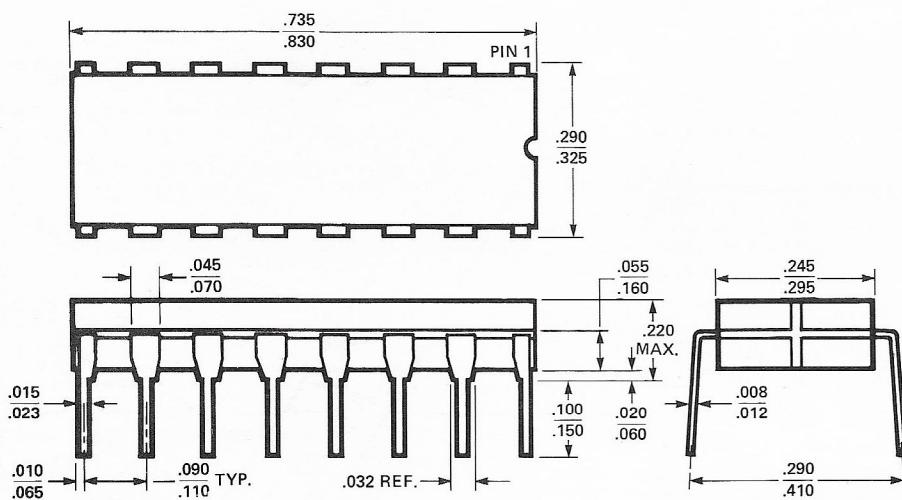
3212 Multi-Mode Latch Buffer
 3214 Priority Interrupt Control Unit
 3301A Schottky Bipolar ROM (256 x 4)

3304A Schottky Bipolar ROM (512 x 8)
 3601 Schottky Bipolar PROM (256 x 4)
 3604 Schottky Bipolar PROM (512 x 8)

PACKAGE CONFIGURATION



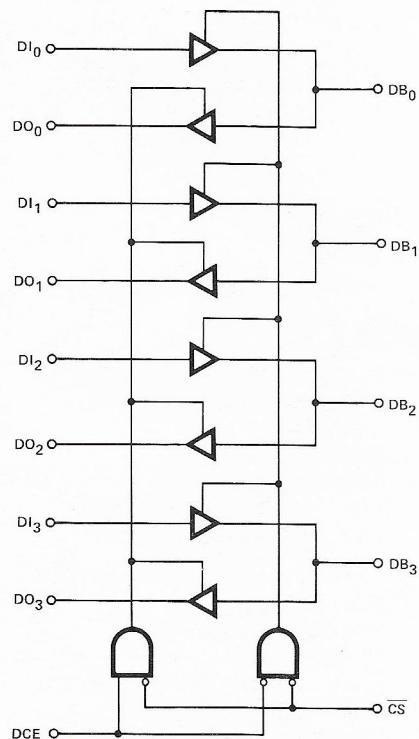
PACKAGE OUTLINE



PIN DESCRIPTION

PIN	SYMBOL	NAME AND FUNCTION	TYPE
1	CS	Chip Select	Active LOW
2,5,11,14	DO	Data Output	
3,6,10,13	DB	Data Bus Bidirectional	
4,7,9,12	DI	Data Input	
8	GND	Ground	
15	DCE	Direction Control Enable	
16	V _{CC}	+5 Volt Supply	

LOGIC DIAGRAM



D.C. AND OPERATING CHARACTERISTICS

ABSOLUTE MAXIMUM RATINGS*

Temperature Under Bias

Ceramic	-65°C to +75°C
Plastic	0°C to +75°C

Storage Temperature	-65°C to +160°C
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All Output and Supply Voltages	-0.5V to +7V
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All Input Voltages	-1.0V to +5.5V
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Output Currents	125 mA
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*COMMENT: Stresses above those listed under "Absolute Maximum Rating" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or at any other condition above those indicated in the operational sections of this specification is not implied.

$T_A = 0^\circ\text{C to } +75^\circ\text{C}$, $V_{CC} = +5\text{V} \pm 5\%$

SYMBOL	PARAMETER	LIMITS				CONDITIONS
		MIN	TYP	MAX	UNIT	
I_{F1}	Input Load Current DCE, CS		-0.15		mA	$V_F = 0.45$
I_{F2}	Input Load Current All Other Inputs		-0.08		mA	$V_F = 0.45$
I_{R1}	Input Leakage Current DCE, CS				μA	$V_R = 5.25\text{V}$
I_{R2}	Input Leakage Current DI Inputs				μA	$V_R = 5.25\text{V}$
I_{R3}	Input Leakage Current DB Inputs				μA	$V_R = 5.25\text{V}$
V_C	Input Forward Voltage Clamp				V	$I_C = -5\text{ mA}$
V_{IL}	Input "Low" Voltage				V	
V_{IH}	Input "High" Voltage				V	
I_{CEX}	Output Leakage				μA	$V_O = 0.45\text{V}/5.25\text{V}$
I_{CC}	Power Supply Current	90			mA	
V_{OL1}	Output "Low" Voltage	0.3			V	DO Outputs $I_{OL} = 15\text{ mA}$ Outputs $I_{OL} = 25\text{ mA}$
V_{OL2}	Output "Low Voltage	0.5			V	DB Outputs $I_{OL} = 50\text{ mA}$
V_{OH1}	Output "High" Voltage	4.0			V	DO Outputs $I_{OH} = -1\text{ mA}$
V_{OH2}	Output "High" Voltage	3.0			V	DB Outputs $I_{OH} = -10\text{ mA}$
I_{SC}	Output Short Circuit Current	-35 -75			mA	DO Outputs $V_O \cong 0\text{V}$ DB Outputs

NOTE: Typical values are for $T_A = 25^\circ\text{C}$

A.C. CHARACTERISTICS

$T_A = 0^\circ\text{C}$ to $+75^\circ\text{C}$, $V_{CC} = +5\text{V} \pm 5\%$

SYMBOL	PARAMETER	MIN	LIMITS TYP ⁽¹⁾	MAX	UNIT	CONDITIONS
T_{PD1}	Input to Output Delay DO Outputs		20		ns	$C_L = 15 \text{ pF}$, $R_1 = 300\Omega$ $R_2 = 600\Omega$
T_{PD2}	Input to Output Delay DB Outputs		20		ns	$C_L = 150 \text{ pF}$, $R_1 = 180\Omega$, $R_2 = 300\Omega$
T_E	Output Enable Time		35		ns	DCE
T_D	Output Disable Time		25		ns	CS
			35		ns	
			25		ns	DCE
						CS

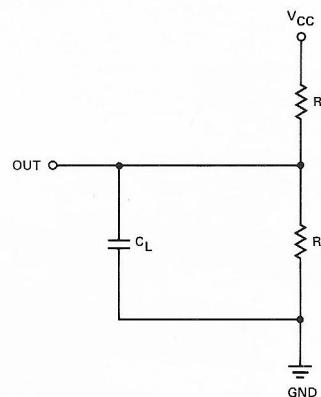
NOTE:

(1) Typical values are for $T_A = 25^\circ\text{C}$ and nominal supply voltage.

TEST CONDITIONS:

- Input pulse amplitude of 2.5V.
- Input rise and fall times of 5 ns between 1 and 2 volts.
- Output loading is 5 mA and 10 pF.
- Speed measurements are made at 1.5 volt levels.

TEST LOAD CIRCUIT:



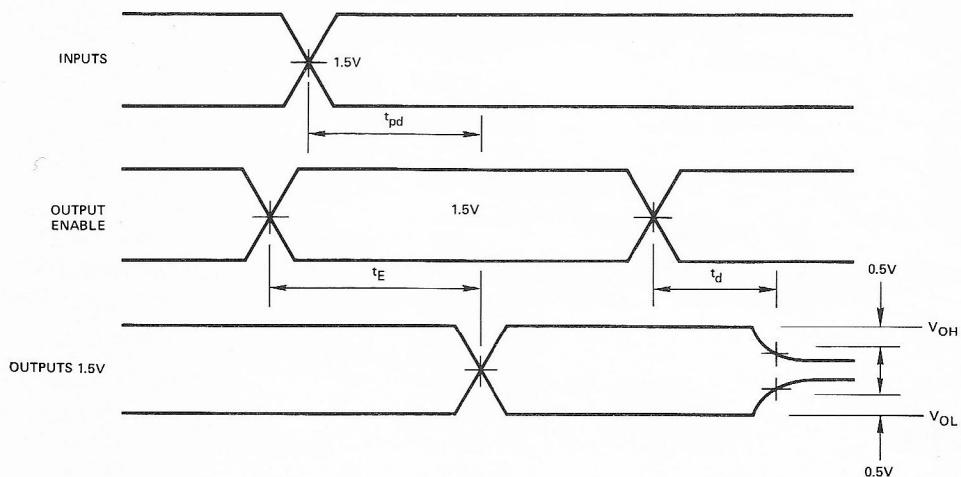
CAPACITANCE⁽²⁾ $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	MIN	LIMITS TYP	MAX	UNIT
C_{IN}	Input Capacitance				pF
C_{OUT}	Output Capacitance				pF

NOTE:

(2) This parameter is periodically sampled and is not 100% tested. Condition of measurement is $f = 1 \text{ MHz}$, $V_{BIAS} = 2.5\text{V}$, $V_{CC} = 5.0\text{V}$ and $T_A = 25^\circ\text{C}$.

3216 WAVEFORMS



ORDERING INFORMATION

Part Number Description
3216 4-Bit Parallel,
Bidirectional
Bus Driver



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